

Title: An estimation Procedure for Multivariate Spatial temporal Model in Small Area Estimation

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Abstract:

A multivariate spatial-temporal small area model is postulated, possibly allowing strength to be borrowed from spatial and temporal correlation. An estimation procedure that incorporates backfitting algorithm, AR-sieve and Lorenz curve parameterization is proposed. Provincial data on mean per capita income quintiles are utilized to illustrate the proposed methods.

Minimal changes in the empirical distribution of parameter estimates for independent variables and spatial component, between iteration are observed. Although the additional temporal effect increased the forecast ability of the models, the spatial-temporal model-fitted group data for some provinces yielded invalid Lorenz curves using either Betas or GQ Lorenz parameterizations.

Using the proposed approach, generation of unit-record synthetic income is feasible even if statistical modeling is done using provincial-level data. Resulting model-based estimates of poverty indices are generally more reliable than its corresponding direct survey estimates.

Few deviations between model-based and direct survey estimates of poverty indices at the domain level are noted, possibly indicating that a single model for all provinces may be improved further by considering domain models.